



Close Combat Tactical Trainer (CCTT) Semi-Automated Force (SAF) BLUFOR Behavior Verification and Validation (V&V) Technical Report

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Objectives

- ① **Verify logical traces of CIS to other CIS or graceful termination**
- ② **Verify CIS selections from the baseline set available for execution**
- ③ **Validate sample set of CIS implementations:**
 - ① **in both isolation and complex vignettes**
 - ② **primarily using all default settings**



Verify CIS Logical Traces

① Method:

- ① Search each baseline CIS for SI and termination
- ② Verify each SI destination is in baseline

② Status:

Completed in July 1995

③ Results:

- ① IDT added 22 CIS/patches to 276-CIS baseline
- ② Still 4 sources to 3 disconnect destinations



Verify CIS Logical Traces: Results

Baseline CIS

Assault Helicopter Company
B2602 Conduct Air Assault Operations

Assault Helicopter Company
B2602 Conduct Air Assault Operations

Air Cavalry/Reconnaissance Troop B1301 Engage Targets
B1303 Use Countermeasures against Enemy
Air Defense Artillery (ADA) to ensure Aircraft
Survivability

Air Cavalry/Reconnaissance Troop B1307 Conduct Area Reconnaissance
B1303 Use Countermeasures against Enemy
Air Defense Artillery (ADA) to ensure Aircraft
Survivability

Air Cavalry/Reconnaissance Troop B1310 Perform Actions on Contact (SI)
B1303 Use Countermeasures against Enemy
Air Defense Artillery (ADA) to ensure Aircraft
Survivability

Destination CIS Disconnect

B2603 Use Countermeasures Against
Enemy ADA to Ensure Aircraft Survivability

B2607 React To Indirect Fire



Verify CIS Selections

① Method:

**Iterative process -- “Can I choose CIS xxxx ?”
from the original baseline (received 11/6/95)**

② Status:

Last conducted in 12 January, 1997

③ Results:

17 % of Tank/Mech PLT not available

30 % of CO/TM not available



Verify CIS Selections: Results

<i>Platform\Category</i>	1	2	3	4#	5#
Tank Platoon	5	14	7	1	3
Mechanized Infantry Platoon	6	18	5	4	3
Scout Platoon	0	0	0	7	3
Company Team	1	9	4	3	3
ADA Platoon	0	0	0	2	0
Attack Helicopter Company	0	0	0	2*	0
Assault Helicopter Company	0	0	0	1*	0
Air Cavalry / Reconnaissance Troop	0	0	0	2	1
Division Armored Cavalry Squadron	0	0	0	4	0
ACT	0	0	0	6	2
Battalion TF	0	0	0	4*	0

Categories Defined

1. Yes, accomplished using another task.
2. Yes, selectable in menu.
3. Yes, executes as SI.
4. Not in menu.
5. Not in menu and unable to observe as SI.

* Platform not available in software.

Delivery requirement may have been deferred to post-block 4.



Validate CIS Sample: Method

- ① **Select BLUFOR CISs for testing**
 - ① **70 Mech/Tank/Scout Platoon**
 - ② **21 Tank CO/TM**
- ② **Build vignette**
- ③ **Validate CIS functionality and performance**
- ④ **Verify CISs covered within each vignette**
- ⑤ **Run formal test and log DIS PDUs for archive**



Validate CIS Sample: Status

- ① **Built/Validated/Tested 40 vignettes**
- ② **Vignettes planned but not completed:**
 - ① **2 CO/TM (7 CISs)**
 - ② **2 Mech/Tank PLT (6 CISs)**
 - ③ **8 Scout PLT vignettes (10 CISs)**



Validate CIS Sample: Tests (1 of 2)

Blk	TC	BLUFOR CISs	Build	Verify	Validate	Test
1	BMPM.0	B0101 B0102 B0103 B0104 B0107 B0117	7-Jun-96	27-Jul-96	21-Jun-96	22-Jun-96
1	BMPM.1	B0101 B0102 B0103 B0104 B0107 B0115	7-Jun-96	27-Jul-96	21-Jun-96	11-Jul-96
1	BTPM.0	B0001 B0002 B0003 B0004 B0006 B0008 B0015	6-Jun-96	27-Jul-96	8-Jun-96	22-Jun-96
1	BTPM.1	B0002 B0003 B0004 B0006 B0008 B0015	6-Jun-96	27-Jul-96	8-Jun-96	11-Jul-96
2	BMPA.0	B0107 B0123 (Staggered Column--no CIS #)	8-Aug-96	8-Aug-96	8-Aug-96	7-Sep-96
2	BMPAL.1	B0101 B0107 B0119	25-Jul-96	27-Jul-96	26-Jul-96	23-Aug-96
2	BMPAR.1	B0101 B0108 B0119	25-Jul-96	27-Jul-96	26-Jul-96	23-Aug-96
2	BMPC.0	B0108 B0109 B0120 B0144 B0154	25-Jul-96	27-Jul-96	27-Jul-96	23-Aug-96
2	BMPC.1	B0118 B0121 B0155	9-Aug-96	24-Aug-96	9-Aug-96	7-Sep-96
2	BMPD.0	B0115 B0126 B0128	25-Jul-96	24-Aug-96	27-Jul-96	6-Sep-96
2	BMPM.2	B0101 B0102 B0103 B0104 B0107 B0115	7-Jun-96	27-Jul-96	21-Jun-96	16-Aug-96
2	BMPM.3	B0101 B0102 B0103 B0104 B0107 B0108 B0115 B0117 B0144	7-Jun-96	27-Jul-96	27-Jun-96	
2	BMPM.4	B0101 B0102 B0103 B0104 B0107 B0115 B0117 B0126	22-Jun-96	27-Jul-96	22-Jun-96	
2	BMPR.0	B0119 B0125 B0129	9-Aug-96	24-Aug-96	10-Aug-96	7-Sep-96
2	BTPA.0	B0031	8-Aug-96	8-Aug-96	8-Aug-96	7-Sep-96
2	BTPA.1	B0021 B0024 B0030	9-Aug-96	6-Sep-96	10-Aug-96	7-Sep-96
2	BTPAL.1	B0001 B0009 B0015	7-Jun-96	8-Aug-96	13-Jul-96	17-Aug-96
2	BTPAR.1	B0001 B0010 B0015	8-Jun-96	8-Aug-96	13-Jul-96	17-Aug-96
2	BTPAL.2	B0002 B0009 B0015	12-Jul-96	8-Aug-96	18-Jul-96	17-Aug-96
2	BTPAR.0	B0002 B0010 B0015	12-Jul-96	8-Aug-96	18-Jul-96	17-Aug-96
2	BTPC.0	B0011 B0014 B0017 B0018	7-Jun-96	8-Aug-96	20-Jul-96	17-Aug-96
2	BTPD.0	B0026 B0032	8-Jun-96	8-Aug-96	19-Jul-96	6-Sep-96
2	BTPD.1	B0003 B0016 B0018 B0025	9-Aug-96	10-Aug-96	10-Aug-96	6-Sep-96
2	BTPM.2	B0002 B0003 B0004 B0006 B0008 B0015	6-Jun-96	27-Jul-96	20-Jun-96	
2	BTPM.3	B0001 B0003 B0004 B0005 B0006 B0015	6-Jun-96	27-Jul-96	20-Jun-96	
2	BTPM.4	B0001 B0003 B0004 B0005 B0006 B0015 B0018 B0025	22-Jun-96	27-Jul-96	22-Jun-96	



Validate CIS Sample: Tests (2 of 2)

Blk	TC	BLUFOR CISs							Build	Verify	Validate	Test
3.4	BCA.0	B1104	B1104	B1108	B1116	B1117	B1145	B1146	17-Oct-96	25-Oct-96	19-Oct-96	25-Oct-96
3.4	BCA.1	B1105	B1111	B1112	B1119	B1145	B1146					
3.4	BCD.0	B1121							20-Sep-96	21-Sep-96	21-Sep-96	21-Sep-96
3.4	BCM.0	B1101	B1106	B1114					19-Sep-96	20-Sep-96	20-Sep-96	20-Sep-96
3.4	BCM.1	B1102	B1114						19-Sep-96	20-Sep-96	20-Sep-96	20-Sep-96
3.4	BCM.2	B1101	B1106	B1114					17-Oct-96	18-Oct-96	18-Oct-96	24-Oct-96
3.4	BCM.3	B1102	B1114	B1124	B1129				17-Oct-96			
3.4	BCR.0	B1101	B1113						20-Sep-96	21-Sep-96	21-Sep-96	17-Oct-96
3.4	BCR.1	B1132	B1144									
3.4	BMPR.1	B0107	B0112	B0113	B0117				14-Nov-96	21-Nov-96	15-Nov-96	21-Nov-96
3.4	BMPR.2	B0122	B0134	B0145	B0156							
3.4	BMPR.3	B0112	B0135	B0146	B0149	B0152						
3.4	BTPAD.0	B0001	B0013	B0014	B0019	B0020	B0021		26-Oct-96	21-Nov-96	26-Oct-96	21-Nov-96
3.4	BTPR.0	B0029	B0031						31-Oct-96	2-Nov-96	1-Nov-96	2-Nov-96
3.4	BTPR.3	B0041										
3.4	BTPTO.1	B0003	B0013	B0017	B0025	B0034			15-Nov-96	21-Nov-96	16-Nov-96	21-Nov-96



Validate CIS Sample: Results (1 of 5)

Function Primitives

Tank Platoon Combat Instruction Set's		Move	Shoot	Search/Observe	Communicate	PTR Status (1/12/97)
B0001	Column Formation	13209, NI	NA	13210, NI	GO	closed, open
B0002	Staggered Column Formation	13211, NI	NA	GO	GO	closed
B0003	Wedge Formation	GO	NA	GO	GO	
B0004	Line Formation	GO	NA	GO	GO	
B0006	Vee Formation	13212, NI	NA	GO	GO	open
B0008	Herringbone Formation	13213, NI	NA	GO	GO	open
B0009	Action Front Drill	GO	GO	GO	GO	
B0010	Action Right Drill	GO	GO	GO	GO	
B0011	Action Left Drill	GO	GO	GO	GO	
B0013	React to Indirect Fire	17424, NI	NA	GO	GO	open
B0014	Contact Drill	17608, NG	GO	GO	GO	closed
B0015	Execute Traveling	GO	NA	GO	GO	
B0016	Execute Bounding Overwatch	GO	NA	GO	GO	
B0017	Execute Traveling Overwatch	GO	NA	17419, NI	GO	open
B0018	Perform AA Activities	GO	NA	GO	GO	
B0019	Take Active AD Measures, Moving	UT	UT	UT	UT	
B0020	Take Active AD Measures, Stationary	UT	UT	UT	UT	
B0021	Conduct Tactical Road March	GO	NA	GO	17609, NI	open
B0022	Execute Actions on Contact	NO	NO	NO	NO	
B0024	Attack by Fire	GO	GO	GO	GO	
B0025	Occupy Hasty BP	GO	GO	GO	GO	
B0026	Occupy Platoon BP	13579, GO	GO	GO	GO	canceled
B0027	Passage of Lines	UT	UT	UT	UT	
B0029	Consolidate and Reorganize	GO	GO	GO	GO	
B0030	Perform Platoon Fire and Movement	GO	GO	GO	GO	
B0031	Assault Enemy Position	16923, GO	GO	GO	GO	canceled
B0032	Execute Platoon Defensive Mission	GO	GO	13578, NI	GO	open
B0033	React to Dismounted Attack	NO	NO	NO	NO	
B0034	Displace to Subsequent BP	17610; 17421, NI	UT	UT	UT	canceled, working
B0036	Take Actions at Obstacle	NO	NO	NO	NO	
B0041	Perform Resupply Operations	NO	NO	NO	NO	

CIS Not Observed (NO)	: This task was not observed executing as either a selectable or SI CIS.
Unable to Test (UT)	: This task was not covered.
Go (GO)	: The CIS primitive was covered.
No Go (NG)	: The CIS primitive does not match the CIS database
Needs Improvement (NI)	: The CIS primitive needs improvement to better match the CIS database
Not Applicable (NA)	: The CIS primitive is not applicable in the CIS database.



Validate CIS Sample: Results (2 of 5)

Function Primitives

Mech Platoon Combat Instruction Set's (1 of 2)		Move	Shoot	Search/Observe	Communicate	PTR Status
B0101	Column Formation	13571, NI	NA	GO	GO	closed
B0102	Line Formation	GO	NA	GO	GO	
B0104	Wedge Formation	GO	NA	GO	GO	
B0105	Herringbone Formation	13214, NI	NA	GO	GO	open
B0107	Execute Traveling	GO	NA	GO	GO	
B0108	Execute Traveling Overwatch	GO	15255, TQ	GO	GO	closed
B0109	Execute Bounding Overwatch	GO	GO	GO	GO	
B0110	Action Right Drill	15256, TQ	15256, TQ	15256, TQ	15256, TQ	open
B0111	Action Left Drill	15256, TQ	15256, TQ	15256, TQ	15256, TQ	open
B0115	Execute Hasty Dismount	NO	NO	NO	NO	
B0116	Mount Vehicle	GO	NA	GO	GO	
B0117	Occupy AA	GO	UT	GO	GO	
B0118	Conduct Tactical Road March	GO	15256, TQ	GO	GO	open
B0119	React to Direct Fire/ATGM	GO	GO	GO	GO	
B0120	Support by Fire	GO	GO	GO	GO	
B0121	Conduct Fire and Movement	GO	GO	GO	GO	
B0123	Assault Mounted	GO	GO	GO	GO	
B0125	Consolidate and Reorganize	GO	UT	GO	GO	
B0126	Establish Hasty BP	GO	NA	GO	GO	
B0128	Defend BP	GO	GO	GO	GO	
B0129	Disengage (Mounted)	GO	GO	GO	GO	
B0134	Cross Defile	UT	UT	UT	UT	
B0135	Clear Woodline	UT	UT	UT	UT	

CIS Not Observed (NO)

Unable to Test (UT)

Go (GO)

No Go (NG)

Needs Improvement (NI)

Not Applicable (NA)

Transition Questionable (TQ)

: This task was not observed executing as either a selectable or SI CIS.

: This task was not covered.

: The CIS primitive was covered.

: The CIS primitive does not match the CIS database.

: The CIS primitive needs improvement to better match the CIS database.

: The CIS primitive is not applicable in the CIS database.

:: A PTR was written against a questionable transition from one CIS to another.



Validate CIS Sample: Results (3 of 5)

Function Primitives

Mech Platoon Combat Instruction Set's (2 of 2)		Move	Shoot	Search/Observe	Communicate	PTR Status
B0144	Move Dismounted (Trvl and TrvlOW)	GO	NA	GO	GO	
B0146	React to Contact (Dismounted)	NO	NO	NO	NO	
B0149	Disengage (Dismounted)	UT	UT	UT	UT	
B0154	Move Dismounted (BOW)	GO	NA	GO	GO	
B0155	React to Contact (Mounted)	NO	NO	NO	NO	
B0112	React to Indirect Fire	GO	NA	GO	GO	
B0113	React to Air Attack	GO	NA	GO	GO	
B0122	Breach Obstacle	UT	UT	UT	UT	
B0145	Cross Danger Area (Dismounted)	UT	UT	UT	UT	
B0152	Sustain	NO	NO	NO	NO	
B0156	Take Actions at Obstacle	NO	NO	NO	NO	
B0137	Emplace Hasty Minefield	NO	NO	NO	NO	

CIS Not Observed (NO)	: This task was not observed executing as either a selectable or SI CIS.
Unable to Test (UT)	: This task was not covered.
Go (GO)	: The CIS primitive was covered.
No Go (NG)	: The CIS primitive does not match the CIS database.
Needs Improvement (NI)	: The CIS primitive needs improvement to better match the CIS database.
Not Applicable (NA)	: The CIS primitive is not applicable in the CIS database.
Transition Questionable (TQ)	:: A PTR was written against a questionable transition from one CIS to another.



Validate CIS Sample: Results (4 of 5)

Function Primitives

Company/Team Combat Instruction Set's		Move	Shoot	Search/Observe	Communicate	PTR Status
B1101	Perform Tactical Movement	16540, GO	UT	GO	GO	closed
B1102	Perform Tactical Road March	UT	UT	UT	UT	
B1104	Execute Actions on Contact	NO	NO	NO	NO	
B1104a	Perform Actions on Contact	NO	NO	NO	NO	
B1105	Assault an Enemy Position (Mounted)	UT	UT	UT	UT	
B1106	Occupy an Assembly Area	GO	N/A	GO	GO	
B1107	Perform Assault Position Activities	UT	UT	UT	UT	
B1108	Perform Attack Position Activities	NO	NO	NO	NO	
B1111	Consolidate on the Objective	UT	UT	UT	UT	
B1112	Reorganize on the Objective	NO	NO	NO	NO	
B1113	Defend Against Air Attack	GO	16543, NI	GO	GO	open
B1114	Change Formation	16541, 15914, GO	N/A	GO	GO	closed
B1116	Initiate Action Left	GO	16543, NG	GO	16542, GO	open, closed
B1117	Initiate Action Right	GO	16543, NG	GO	16542, GO	open, closed
B1119	React to Indirect Fires	UT	UT	UT	UT	
B1121	Defend	GO	GO	GO	16542, GO	open
B1123	Support by Fire	UT	UT	UT	UT	
B1124	Breach an Obstacle	16538, NI	N/A	NO	NO	verify
B1129	Perform Hasty River/Gap Crossing	NO	NO	NO	NO	
B1132	React to Reinforced Obstacle	NO	NO	NO	NO	
B1144	Perform Service-Station Resupply	NO	NO	NO	NO	

CIS Not Observed (NO)

: This task was not observed executing as either a selectable or SI CIS.

Unable to Test (UT)

: This task was not covered.

Go (GO)

: The CIS primitive was covered.

No Go (NG)

: The CIS primitive does not match the CIS database

Needs Improvement (NI)

: The CIS primitive needs improvement to better match the CIS database

Not Applicable (NA)

: The CIS primitive is not applicable in the CIS database.



Validate CIS Sample: Results (5 of 5)

Unit Type	n CIS	n Prims	Ratings					NA
			GO	NI	NG/TQ	NO	UT	
Tank Platoon	31	124	70	10	1	16	15	12
Mech Inf Platoon	36	144	71	2	10	28	22	11
Company Team	21	84	22	2	2	30	25	3

Unit Type	Appropriate Primitives	Percentages				
		Total		With Data		
Tank Platoon	112	62.5	9.8	27.7	86.4	13.6
Mech Inf Platoon	133	53.4	9.0	37.6	85.5	14.5
Company Team	<u>81</u>	<u>27.2</u>	<u>4.9</u>	<u>67.9</u>	<u>84.6</u>	<u>15.4</u>
TOTALS	326	50.0	8.3	41.7	85.8	14.2



Validate CIS Sample: PTRs (1 of 2)

Num	State	Sev	Abstract	Urgency
13209	closed	2	BLU Tank COLUMN departure speeds too slow.	P3I
13210	open	5	BLU Tank platoon in COLUMN scanning wrong sectors.	post_block4
13211	closed	2	BLU Tank platoon in STAGGERED COLUMN moving out at wrong speed.	P3I
13212	open	5	BLU Tank platoon vehicles in VEE formation in wrong spots.	post_block4
13213	open	5	BLU Tk plt vehicles in HERRINGBONE formation in wrong spots.	post_block4
13214	open	5	BLU Mech plt vehicles in HERRINGBONE formation in wrong spots.	post_block4
13571	closed	2	Mech PLT column formation mismatch with CIS documentation	block2
13577	closed	2	OPFOR Tank Co: Conduct Meeting Engagement not working	block3
13578	open	4	Excessive scanning by BLU TNK PLT while in a PLT Def Mission.	post_block4
13579	cancel	2	Orientation problem with BLUFOR CIS OccupyBattlePosition	block2
13584	cancel	2	Dead PLT LDR sending Spot Reports	block2
13585	cancel	2	BLU TNK drives through dead T-80's.	block2
13836	closed	4	Problem with JAVELIN shot lines from TDB origin	block2
13837	open	2	Problem with vehicles maintaining orientation	amber
15255	closed	2	Invalid Transition from CIS B0108 to CIS B0119.	block2
15256	open	5	Invalid Transition from CIS B0118 to CIS B0119	block2
15911	cancel	2	Problem with OPFOR SI to Idle	block3
15912	closed	4	Problem PVD and tube orientation	block3
15913	cancel	3	Problem with vehicles getting lost on collisions	block3
15914	closed	3	Problem with CO/TM wedge formation	block3

** Status as of 24 January, 1997



Validate CIS Sample: PTRs (2 of 2)

Num	State	Sev	Abstract	Urgency
16538	verify	2	Problem with Company Level Obstacle Breach	red
16539	closed	3	Problem with Company Level movement--FISTV stopping short	red
16540	closed	3	In Company Level movement--lead PLT never slows from march spee	block3
16541	closed	3	Problem with CO/TM Echelon formations	green
16542	closed	3	No CO/TM SPOT Reports	amber
16543	open	2	CO/TM M1s firing at DIs instead of BMPs	ccb
16923	cancel	3	Tank Platoon will not exit assault CIS B0031	amber
17419	open	3	Tank Platoon: Traveling Overwatch, PL & PSG do not orient/scan.	green
17421	workin	3	Tank Platoon: No transition out of B0034 to B0013.	green
17424	open	3	Tank Platoon: Will not increase to dash speed in CIS B0013.	green
17607	return	2	Invalid SI to AD for tank PLT	amber
17608	open	2	Bypass route not working for B0014	iote_red
17609	open	3	SITREP not issues when PLT clears SP	amber
17610	cancel	2	Problem executing CIS B0034	post_block4
17611	closed	2	Ineffective weapon use for M2	amber

** Status as of 24 January, 1997



Issues

- ① 13837 -- Orienting armor toward enemy
- ② 15256 -- IDT Transition Tables altered from CIS
- ③ 16543 -- Prioritizing targets
- ④ Testing on a moving benchmark yields misses



Conclusions

- ① **Tank/Mech platoons in fair-to-good shape**
- ② **CO/TM in fair-to-good and unchecked shape**
- ③ **CISs provide valuable benchmark tool**



Recommendations

- ① **Collect data for NO/UT CISs**
- ② **Track fixes for NI/NG PTRs**
- ③ **Assess changes through LUT/IOT&E**
- ④ **Initiate assessment of other unit types**
- ⑤ **Screen and update CATT Task Data Base**